

SUPRASPECIFIC NAMES OF MOLLUSCS: A QUANTITATIVE REVIEW

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ABSTRACT

The number of nomenclaturally available genus-group taxa described since 1758 for Recent and fossil molluscs has been estimated by two methods. One result stands at 28,400 names; another at 24,900 names, of which 12,700 are gastropods, 6,000 are cephalopods, 5,100 are bivalves and 1,100 are in the smaller classes. The yearly increment appears to have remained relatively stable since the late 19th century. It is presently at an average of 224 new genus-group names per year, with Cephalopoda representing precisely one-third of the names. At least 20% of the recently introduced taxa escape the *Zoological Record*, with the Soviet and paleontological literatures especially underrepresented. In the last 30 years, journals and books published in USSR, USA, and China contain altogether 50% of the new names. The total number of nomenclaturally available genus-group names of Recent molluscs is on the order of 12,000. It is estimated that the number of family-group names for molluscs is over 5,000.

Key words: genus-group names, family-group names, numbers, nomenclature, nomenclators, trends, literature coverage.

INTRODUCTION

Although estimates of molluscan species diversity (Nicol, 1969; Boss, 1971; for a criticism, see Solem, 1978) exist, genus-group names, as defined by Article 42 of the *International Code of Zoological Nomenclature*, have not received similar attention for many years. In molluscs, as in other large groups of Recent and fossil animals, taxonomic work is hampered by the lack of adequate, up-to-date, comprehensive manuals, and by the vast number of journals and books containing descriptions of new taxa. The fate of every family- or genus-level taxonomic treatise is to be incomplete or outdated the very year it is published. In malacology, the currently available taxonomic academic treatises are 20-50 years old (Wenz, 1938-1944; Zilch, 1959-1960; Moore, 1960-1971). In 1987, as a result of this frustration, we started to compile a loose-leaf index to the new supraspecific names proposed since 1960 for Recent and fossil molluscs, exclusive of cephalopods. As this work is now being extended to encompass the older literature, we have found it interesting to quantify the abundance of names involved, to identify trends in current taxonomic literature, and to evaluate the efficiency of the supposedly most complete indexing system, the *Zoological Record*. The present paper documents these findings and discusses their implications.

Taxonomic research in malacology demonstrates a strong division between cephalopod and non-cephalopod literature. In particular, ammonoid research is almost totally separated from other fields of molluscan research: malacological journals only exceptionally contain papers on ammonites; ammonite and other cephalopod specialists rarely interact with other malacologists in national and international congresses. Our index, which reflects our own research interests, excludes cephalopods and is itself an illustration of this dichotomy. As a consequence, while some of our results are concerned with Mollusca in general, others deal only with Mollusca exclusive of cephalopods.

METHODS

The number of genus-group taxa in Mollusca is based on an evaluation of the number of names contained in various catalogues, nomenclators and checklists. Names enumerated in the sources listed in Table 1 were counted. For the *Nomenclator Zoologicus*, we counted the molluscan names in 50 pages (chosen from five consecutive pages in ten random samples) per volume. The total of 250 pages sampled represents about 5% of 4,816 pages included in the *Nomenclator*. Only original spellings were considered.

To index the supraspecific names proposed after 1960, we first scanned the *Mollusca* volumes of the *Zoological Record* for the relevant years. For Cephalopoda, only genus-group names were considered: we simply counted them without further checking. For classes other than cephalopods, genus-group and family-group names were considered separately. The original publications were consulted, and all newly introduced names were checked and recorded.

In a second phase, we used a combination of approaches to find names (of non-Cephalopods) omitted in the *Zoological Record*: (a) We scanned biographical compilations of malacologists containing their lists of papers and taxa (e.g. Powell by Cernohorsky, 1988; Habe by Inaba & Oyama, 1977), and yearly or cumulative indices for malacological journals (e.g. Anonymous, 1979); (b) We searched malacological and regional journals not covered by the *Zoological Record* that we knew contained new malacological taxa (e.g. *Notiziario del CISMA*, Roma; *Schriften zur Malakozoologie*, Cismar); (c) We used library facilities in Paris (Muséum National d'Histoire Naturelle, Société Géologique de France, Centre National de la Recherche Scientifique, Université Pierre et Marie Curie and several personal libraries), Leningrad (Zoological Institute of the Academy of Sciences and All-Union Geological Institute of the Ministry of Geology), London (The Natural History Museum), Stockholm (Naturhistoriska Riksmuseet and University Library) and Frankfurt (Senckenberg Library), including browsing through collections of reprints in departmental libraries; (d) We reviewed available papers for secondary uses of supraspecific names published elsewhere in unrecorded places; this method proved particularly useful with the Soviet literature; (e) The recent (since 1985) Chinese paleontological literature is covered by the quarterly *Gushengwuxue Wenzhai* (English subtitle: Paleontological Abstracts), and we discovered many names in this abstracting journal; (f) Recently published catalogues of names (such as Vokes, 1980, 1990; Vaught, 1989) were also scanned for omissions, and several colleagues provided references to obscure names.

Our data base is therefore far more complete for non-cephalopods than for cephalopods. Even for non-cephalopods, it is admittedly still a little incomplete but provides the best available source of supraspecific names for the years 1960–1989.

RESULTS

Number of Genus-Group Taxa in Mollusca

We estimated the total number of genus-group names by two independent methods. One method relies primarily on a statistical analysis of the names listed in *Nomenclator Zoologicus*. The other is based on the various catalogues and checklists available for selected classes of the phylum.

Evaluation Based on *Nomenclator Zoologicus*

(a) 1758–1965: We counted molluscan genus-group names in a set of 250 pages of the *Nomenclator Zoologicus*, selected as described under "Methods." Excluding incorrect subsequent spellings, there is an average 4.77 molluscan names per page, and the total number of nomenclaturally available genus-group names can be estimated at 23,000 for the period 1758–1965. This number is a minimum because some names certainly have escaped the *Nomenclator Zoologicus*. It is our experience, however, that while omissions appear to become more numerous with recent volumes, as we document below, the coverage of the *Nomenclator Zoologicus* is fairly good for the years 1758–1935. We therefore believe 23,000 names to be a reliable estimate.

(b) 1966–1989: Using the combination of methods outlined above, our index of non-cephalopod names for the period 1966–1989 contains 3,644 genus-group taxa. For the same period, the *Zoological Record* lists 1,448 genus-group names of Cephalopoda. If it is conservatively assumed that 20% of the cephalopod names have escaped the *Zoological Record* (see below), then the total number of cephalopod names introduced during that period would be 1,810. The total number of molluscan genus-group names introduced in the years 1966–1989 is therefore approximately 5,400.

The total number of genus-group names in Mollusca therefore amounts to circa 28,400 names.

Evaluation Based on Catalogues

A number of catalogues or counts are available for selected classes or subclasses of Mollusca. We have counted the number of genus-group names in comprehensive works,

TABLE 1. Number of genus-group names of molluscs, partitioned by class

	Total	Recent
Aplacophora	80 (a)	80 (a)
Monoplacophora	267 (b)	9
Polyplacophora	282 (c)	205 (a,c)
Bivalvia	5090 (d)	2043 (d)
Scaphopoda	63 (e)	57 (a)
Gastropoda	12721	9004 (a,g), 10451 (a)
Prosobranchia	7149 (f)	4112 (g), 5559 (a)
Opisthobranchia	982 (h)	817 (a)
Pulmonata	4590 (i)	4075 (a)
Hyolitha, Rostroconchia, etc..	362 (j)	0
Cephalopoda	6000 (k)	305 (l)
Total	24865	11703–13150

Sources:

(a) after Vaught (1989); (b) after Knight & Yochelson, and Knight, Batten & Yochelson, in Moore (1960), plus increment; (c) after van Belle (1975–78), plus increment; (d) after Vokes (1980), plus increment; (e) after Ludbrook, in Moore (1960), plus increment; (f) after Schilder (1947) for the period 1758–1932, an estimated increment of 45.5 names/yr. for the period 1933–1959 (see Table 4), and our own counts for 1960–1989; (g) same as (f), but estimated increment 24.3 names/yr; (h) after Zilch (1959–60), Russell (1971, 1986), and increment; (i) after Zilch (1959–60), plus increment; (j) Hyolitha and Tentaculitida after Fisher, in Moore (1962), plus increment; Rostroconchia after Vokes (1980), plus increment; (k) Ammonoida and Nautilida after Hewitt (1989), modified; (l) after Nesis (1987).

handbooks and catalogues, as listed in Table 1. Because none of these sources is complete to 1989, we have added an increment, based on our own index for the more recent years. When these independent subcounts are added, the result is 24,900 names (Figs. 1, 3).

Number of Genus-Group Names of Recent Mollusca

In this analysis, a name is classified as Recent if it is based on a Recent type species. Therefore, Recent and fossil constitute two mutually exclusive categories: we are fully aware that this is only an approximation of the actual situation.

From the sources listed in Table 1, we conclude the number of genus-group names of Recent Mollusca (Fig. 2; see also Fig. 4) to be approximately 12,000, or 42% of all molluscan genus-group names. As a comparison, Vaught (1989), who also listed incorrect subsequent spellings, chresonyms (one name

may be tabulated several times), and some genus-group names with fossil type species, enumerated approximately 15,000 names.

Discussion

The two estimates, 28,400 and 24,900, are consistent with each other and differ only by 12%. We believe that the discrepancy between the two figures arises mainly from our use of Schilder (1947) for an evaluation of the number of names in the Prosobranchia. Schilder's data were based on Wenz (1938–44), which is fairly complete only for names published before 1933. We do not know to what extent Schilder corrected his counts with the literature published in 1933–1947, and this fact alone could explain a "loss" of several hundred names.

Our results are intermediate between two previously published estimates: (1) Schilder (1949) estimated that there were 11,260 genera established for "living and fossil shells." Because he did not explain how he obtained his results, or what he meant with "shells," it is difficult to comment. We consider that this very low figure is a gross underestimation of the actual number of names involved, even when one appreciates that Schilder made his statement more than 40 years ago.

(2) Vokes (1967) stated he had a card file containing 40,000 names of Mollusca extracted from volumes 1–5 of *Nomenclator Zoologicus*, a much higher figure than our own results indicates. We corresponded with Dr. Vokes to discuss this difference, and we have had access to the card-index that was the basis for his 1967 and 1980 catalogues, which he generously donated in 1991.

It appears that Vokes listed incorrect subsequent spellings as well as original spellings: on average, 22.5% of the names enumerated in Vokes (1980) are incorrect subsequent spellings, and as many as 37.9% of the 8,200 cards in his bivalve card-index are for nomenclaturally unavailable names (incorrect subsequent spellings, chresonyms, etc.). From this evidence, we conclude that 40,000 was a gross overestimate, and that it should not be regarded as an accurate number of molluscan genus-group names.

Naming Activity in the Last 30 Years

In the period 1960–1989, 6,720 new molluscan genus-group names have been introduced. Numbers for classes other than ceph-

Partition by class, 1758-1989

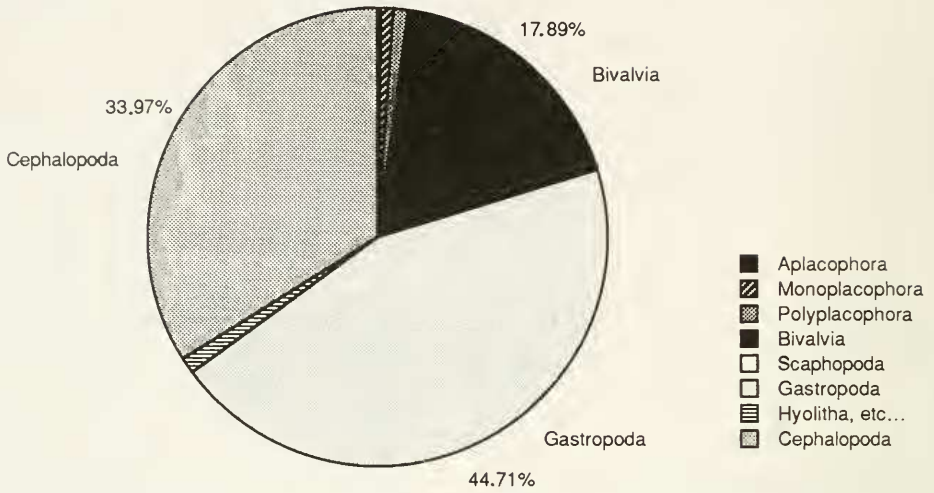


FIG. 1. Number of genus-group names of Mollusca introduced since 1758, partitioned by class.

Recent Mollusca, Partition by class

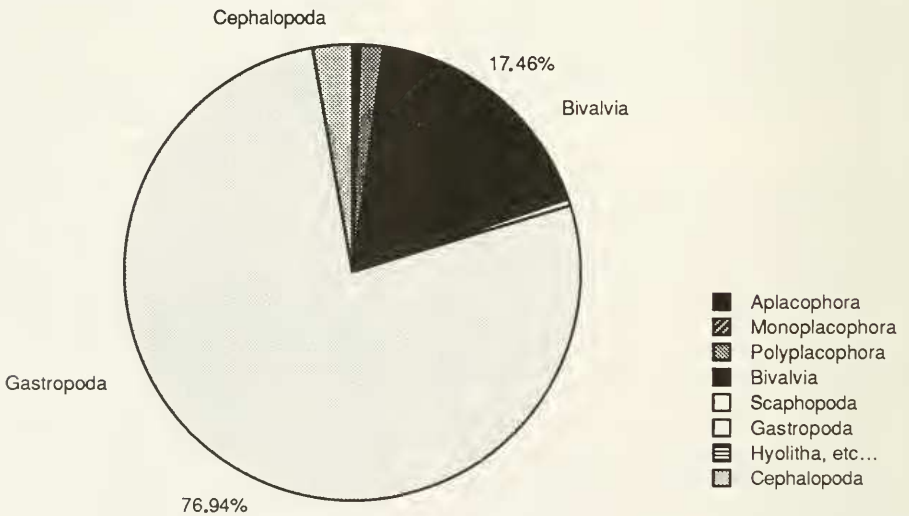


FIG. 2. Number of genus-group names of Recent Mollusca introduced since 1758, partitioned by class.

alopods represent genus-group names actually found by us. For the Cephalopoda, we use the count of names recorded by the *Zoological Record*, corrected on the basis of an estimated 20% omission rate by the *Zoological Record*.

The breakdown by class, and Recent vs.

fossil, is presented in Table 2 and Figure 5. For simplicity, Caudofoveata and Solenogastrea have been grouped under "Aplacophora," and the minor fossil classes are grouped under a single entry. For the controversial contents of the Monoplacophora, we have followed Runnegar & Pojeta (1985).

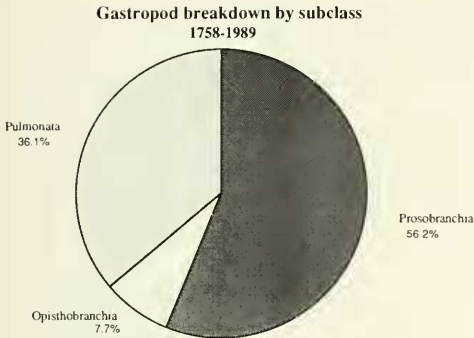


FIG. 3. Number of genus-group names of Gastropoda introduced since 1758, partitioned by subclass.

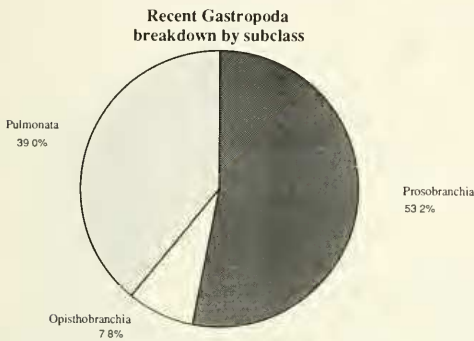


FIG. 4. Number of genus-group names of Recent Gastropoda introduced since 1758, partitioned by subclass.

These results lead to several observations:

1. Cephalopod names can be estimated at 33% of the total on the basis of volume 7 of *Nomenclator Zoologicus*, the only one that indicates class level. Counts for the entire period 1960–1989 give 33.3%. It is remarkable that 98.2% of all cephalopod genus-group names are based on fossils.
2. Within the Gastropoda, which comprises 37.5% of the total, the number of taxa can be further subdivided by subclass as presented in Table 3 and Figure 6.

Of all gastropod names, 62.6% are based on Recent species, 37.4% on fossil species. It is interesting to note that 61.7% of Archaeogastropoda names, which date back to the early Paleozoic, are based on fossils, whereas only

40.9% of Neogastropoda, which date back to the Cretaceous, are based on fossils. Considering that there are many more taxonomists working on Recent gastropods than on Paleozoic ones, this would tend to indicate that name counts do reflect some pattern of overall diversity, rather than the activity of taxonomists.

3. Bivalves are, to a considerable extent, dominated by paleontological research: 79.6% of all bivalve genus-group names are based on fossil species.

Zoological Record Coverage

We have estimated the *Zoological Record* coverage by two alternative methods.

1. Volume 7 (1956–1965) of the *Nomenclator Zoologicus* is largely based on the *Zoological Record* (the same typographical errors that crept in the *Zoological Record* also appear in the *Nomenclator*, e.g. *Apollonia* misspelled *Appollonia*). We searched for 311 names (all the names beginning with A, B or C) known to us, published during this span of years—56 names (18.0%) were found missing in that volume.
2. For the period 1966–1989, the *Zoological Record* listed some 2,848 genus-group names of Mollusca exclusive of Cephalopoda. (Names published in the 1950s but recorded by the *ZR* in the 1960s were not counted by us in this total. Names published in 1989 and recorded by the *ZR* in the 1989–90 volume were counted.) Our own index contains 3,644 names for the same period. This indicates a coverage by the *Zoological Record* of 78.2%, or an omission rate of 21.8%.

This is admittedly an optimistic estimate, because our own index has also certainly missed a number of names. For instance, we know of another 85 names with incomplete references or no references at all, which we have not yet been able to trace to their primary source. If these 85 names are considered when calculating the omission rate, it then jumps to 23.7%.

Therefore, it seems fair to conclude that at least 20% of new genus-group names have been omitted in the last 35 years by a nomen-

TABLE 2. Breakdown, by class, of new genus-group names introduced in 1960–1989

	Paleozoic	Mesozoic	Cenozoic	Total Fossil	Recent	Total	Increment (names/yr.)
Aplacophora	—	—	—	—	32	32	1.1
Monoplacophora	173	1	—	174	7	181	6.0
Polyplacophora	30	2	1	33	15	48	1.6
Bivalvia	301	525	275	1101	282	1383	46.1
Scaphopoda	7	1	1	9	24	33	1.1
Gastropoda	164	293	477	934	1566	2500	83.3
Hyolitha, Rostroconchia, etc.	305	2	1	308	—	308	10.3
Cephalopoda				2197	38	2235	74.5
Grand Total				4756	1964	6720	224

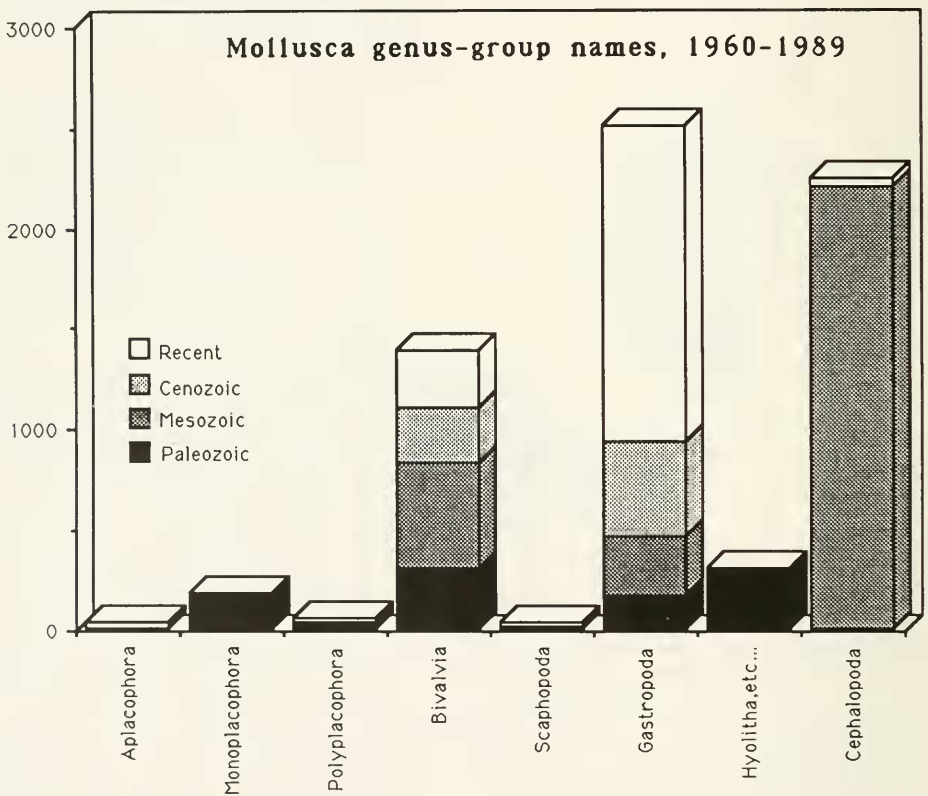


FIG. 5. Number of genus-group names of Mollusca introduced in the period 1960–1989, partitioned by class. All fossil Cephalopoda have been plotted under Mesozoic, which is admittedly an oversimplification.

clator considered to be the most complete in terms of coverage of the taxonomic literature.

It is important to emphasize that omission by the *Zoological Record* is not random. The most imperfect coverage is of the Soviet literature, in particular the coverage of paleontological monographs. Altogether, probably as

much as one-third of names proposed in the Soviet literature escapes the *Zoological Record*. Other imperfectly covered literatures are those from China, Japan, South America and southern Europe. We confirm the generally accepted belief that books are much more poorly recorded than journals.

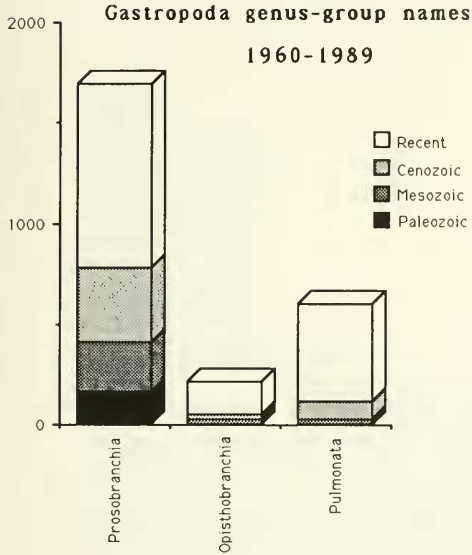


FIG. 6. Number of genus-group names of Gastropoda introduced in the period 1960–1989, partitioned by subclass.

Temporal Variation in Names Output

The year of publication of genus-group names has been extracted from the samples of the *Nomenclator Zoologicus* described above, and grouped by periods of 30 years. Table 4 shows the total number of genus-group names proposed for each period of 30 years, and the yearly rate within each of these eight periods.

An examination of the number of supraspecific names contained per volume of *Zoological Record* for the period 1960–1989 reveals considerable variability in the yearly output and indicates that no single randomly selected year can be considered representative for the period.

Table 4 and Figure 7 show a regular growth of the yearly increment during the first 100 years, with a faster growth in the latter part of the 19th century. The yearly output has subsequently remained remarkably stable at 170–200 genus-group names per year since 1880, with a slight minimum in the period 1936–1965 (also noted by Solem, 1978).

Hewitt (1989) stated that the recent decades are characterized by important "monographic bursts" in nautiloid and ammonoid taxonomy. Such bursts have certainly occurred elsewhere in selected groups and fau-

nas, such as the Aplacophora, for which 40% of the names have been introduced in the last 30 years. However, contrary to a rather general belief among many molluscan taxonomists, Table 4 and the graph suggest only a moderate increase, not an overall explosion, in the output of names over this 30-year period.

Which Country Produces the Most Molluscan Taxa?

To answer this question we have plotted for 1960–1989 the number of new genus-group names (non Cephalopods only) by country of origin of the author (Fig. 8), and separately by country of publication. When multiple authorship is involved, each author is counted for 0.5 (two authors), 0.33 (three authors), etc.

In the period 1960–1989, authors from 53 countries are involved, with those from USSR, USA and China accounting for a little over half (50.3%) of the names. Below the 6th rank (New Zealand, 4.1%), the percentage is already below 5%, and the 1% mark is reached at the 17th rank (Cuba).

National output should **not** be used as a key to overall molluscan biological diversity of the different parts of the world. While it is true that, to some extent, the vast majority of the Japanese naming activity focuses on the Japanese (paelo)fauna, the naming activity of many countries involves faunas from several oceans or continents: a marine snail from the Caribbean is just as likely to be named by an American or a European author. In other words, there is no immediate biological explanation for the differences in numbers of mollusc genus-group names described in each country.

It is remarkable that New Zealand, Australia and Czechoslovakia, with national populations of respectively 3.4, 16.8 and 15.6 million, rank among the 10 countries with the highest output. New Zealand is then not only the country with the highest number of sheep per capita, but also the country with by far the highest output of mollusc genus-group names per capita!

Ranking by country of publication (Table 6) is not significantly different from the ranking by country of origin of authors. This means that authors do not, as a rule, "expatriate" their papers in journals of other countries. However, Germany and, to a lesser extent, Great Britain rank higher as publishers than

TABLE 3. Breakdown, by subclass, of new gastropod genus-group names introduced in 1960–1989

	Paleozoic	Mesozoic	Cenozoic	Total Fossil	Recent	Total
Prosobranchia	163	245	364	772	916	1688
Archaeogastropoda	148	61	26	235	146	381
Mesogastropoda	15	167	156	338	482	820
Neogastropoda	—	17	182	199	288	487
Opisthobranchia	—	24	21	45	168	213
Pulmonata	1	24	92	117	482	599
Total	164	293	477	934	1566	2500

TABLE 4. Estimates of number of genus-group names introduced during 30-year periods

period	1758– 1787	1788– 1817	1818– 1847	1848– 1877	1878– 1907	1908– 1935	1936– 1965	1966–1989 (1)	1966–1989 (2)
time (yr)	30	30	30	30	30	28	30	24	
names	171	874	2755	3002	5643	5947	5115	4333	5454
increment	5.7	29.1	91.8	100.1	188.1	212.4	170.5	180.5	227.3

(1) Names actually recorded by the *Zoological Record* (2) Names found by us (non-cephalopods) + cephalopod names estimated on the basis of a 20% omission rate.

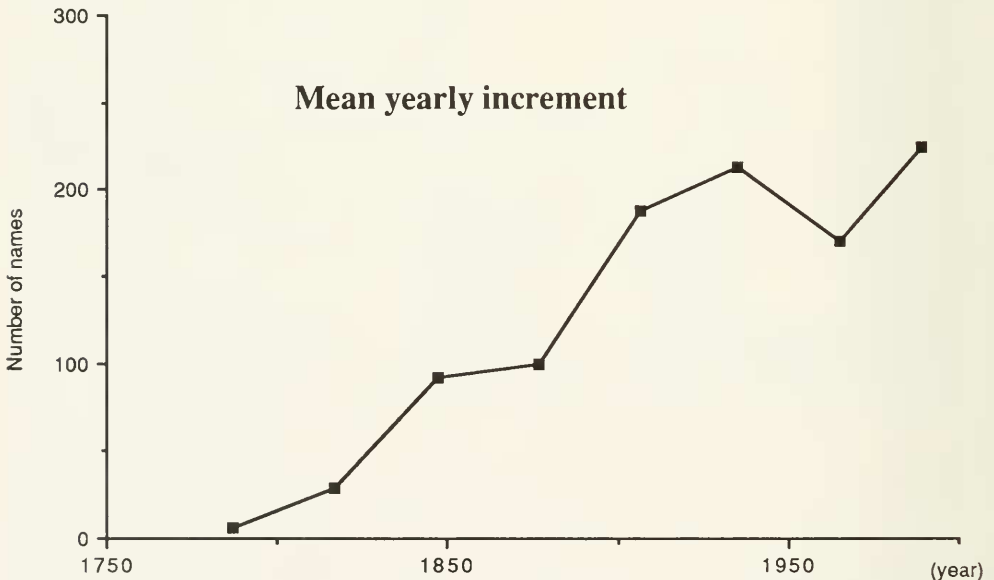


FIG. 7. Mean yearly increment of new genus-group names of Mollusca, calculated over 30-year periods.

as authors, whereas the opposite is true for New Zealand.

Family-Group Names

No estimate of the number of family-group names, as defined by Article 35 of the *Code*,

available for molluscs has ever been published. A fact well known to taxonomists is that a new family may be erected without even mentioning that a new name is being introduced. For that reason, we believe that our data base is slightly less complete for family-group names than for genus-group names.

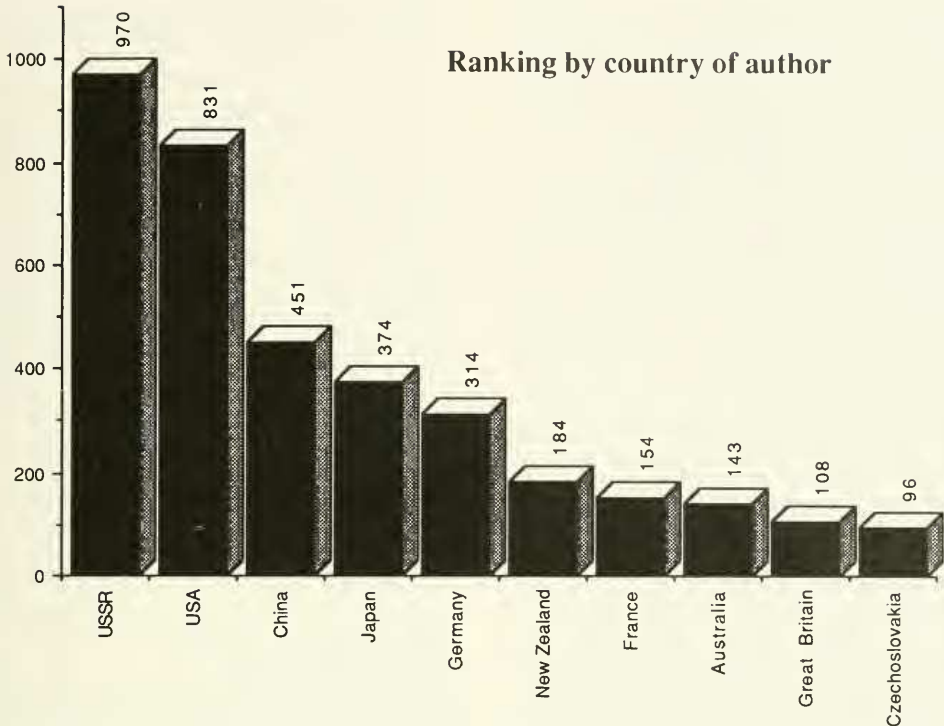


FIG. 8. Ranking of number of genus-group names of Mollusca (exclusive of Cephalopoda) introduced in 1960–1989, partitioned by country of origin of author.

TABLE 5. Ranking of country of origin of author as a function of total number of genus-group names.

1 Country	2 no. of names	3 %	4 Rank
USSR	970	21.6	1
USA	831	18.5	2
China	451	10.1	3
Japan	374	8.3	4
Germany	314	7.0	5
New Zealand	184	4.1	6
France	154	3.4	7
Australia	143	3.2	8
Great Britain	108	2.4	9
Czechoslovakia	96	2.1	10
Total	3625	80.7	

TABLE 6. Ranking of number of genus-group names arranged by place of publication (1960–1989)

Rank	Country	no. of names	%
1	USSR	955	21.3
2	USA	901	20.1
3	China	446	9.9
4	Germany	415	9.3
5	Japan	390	8.7
6	Australia	154	3.4
7	France	146	3.3
8	Great Britain	143	3.2
9	New Zealand	133	3.0
10	Italy	99	2.2
1–10		3782	84.4

The only partial checklist of family-group names is that by Ponder & Warén (1988) for the Caenogastropoda and Heterostropha. It lists 833 names, of which 187 were introduced in the period 1960–1987.

Our own index lists 1,102 new family-group names proposed for molluscs exclusive of cephalopods in the period 1960–1989. If we assume that the ratio of names published before and after 1960 is the same for Caeno-

gastropoda + Heterostropha as for the rest of the molluscs, then **the total number of family-group names available for molluscs exclusive of cephalopods can be estimated at 4,900**. No similar figure is available for Cephalopoda, but Hewitt (1989) counted 409 nautiloid and ammonoid families.

In our view, this demonstrates the need for a new nomenclatural tool that would be to family-group names what the *Index Animalium* (Sherborn, 1902; 1922–1932) and the *Nomenclator Zoologicus* are to species-group and genus-group names respectively.

Epilogue

The sheer magnitude of the numbers discussed in this paper will certainly draw contrasting opinions among malacologists. Two extreme views can be expected. In one view, the newly named taxa are deemed to represent taxonomically valid units, and the current naming activity simply demonstrates the gross incompleteness of the knowledge on the diversity of this phylum. In the opposite view, most of the newly created names are synonyms and the current naming activity is the symptom of a system gone crazy.

Superfluity in molluscan nomenclature appears to be a recurrent concern among professional taxonomists (e.g. Schilder, 1949; Nicol, 1958; Boss, 1971, 1978). Schilder (1949) estimated that 34% of the names available to classify prosobranchs were synonyms. However, whereas 49% of the names established in 1808–1857 were synonyms, the synonymy ratio decreased to 37%, 34% and 21% respectively for the next consecutive 25-year periods (Schilder, 1949). This can be interpreted in two ways: either taxonomists have been doing better work since the early 19th century, or it takes a long period of time (in excess of 75 years) before the value of a genus-group name can be properly assessed. It is likely that both elements reflect the actual situation, an opinion already expressed by Schilder & Schilder (1947). Schilder (1947) had also suggested that genus-group names of Recent and fossil prosobranchs, described and undescribed, would amount to about approximately 20,000, of which 5,000 would still be extant. This prediction may not be as unrealistic as it may first seem: in bivalves, fossils outnumber Recent genus-group names in the proportion of 2–3 to 1; and there are already in the order of 5,000 Recent prosobranch genus-group names. If Schilder was correct, this

would mean that more than 10,000 fossil prosobranch genera still await naming, a daunting perspective!

Naming activity strongly reflects national traditions. There used to be a time when malacologists from Australia and New Zealand did not expect that their fauna might already have been described by workers in other parts of the world, and consequently engaged in overnaming what they considered to be entirely endemic faunas. The expression “another creation” was even used for the Australian biota. It is clear that this scientific isolation has now ended, and that the high level of molluscan naming activity in New Zealand and Australia is the result of a healthy descriptive malacology there in a worldwide context.

Notwithstanding our unfamiliarity with Paleozoic and Mesozoic faunas, we remain greatly concerned by the introduction of new taxa at the genus and family levels based on poorly preserved fossils or molds. Certain branches of malacology are also undoubtedly suffering from “inbreeding,” a case in point being the immense literature on the Neogene Ponto-Caspian basins.

Despite these reservations, we do not share the view that overnaming is the single most important factor explaining yearly increments of 224 molluscan genus-group names, and 40+ family-group names. In the last 30 years, whole new faunas have been discovered, either Recent (e.g. oceanic hydrothermal vents) or fossil (e.g. lower Cambrian of China); old faunas have been readdressed using new techniques (e.g. scanning electron microscopy, SCUBA diving) and new characters (e.g. anatomy of minute species). And, perhaps most importantly, the phase of intellectual stagnation that followed Thiele's epoch-making *Handbuch* is giving way to stimulating and provocative ideas. In this process, superfluous names undoubtedly become introduced, but we are convinced that these do not minimize the considerable amount of genuine discoveries being made every year.

The unexpectedly high omission rate of *Zoological Record* should cause concern to all taxonomists. Because this nomenclator is the main bibliographical source of many (paleo)zoologists, this factor alone poses an important threat to nomenclatural stability. We believe that this justifies the establishment of new criteria of availability of zoological names, whereby a published name would have to be registered by the International Commission of Zoological Nomenclature be-

fore it is declared nomenclaturally available (Bouchet, in press).

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